

What is claimed is:

1. A method for real-time market-based resource allocation, comprising:

receiving at least one bid in real-time for a resource;

deciding which of the at least one bids has won the bidding; and

controlling the resource so that it is committed to the winning bidder.

2. The method of claim 1, wherein the resource is bandwidth.

3. The method of claim 1, wherein the resource is buffer space.

4. The method of claim 1, wherein the resource is processor time.

5. The method of claim 1, wherein the resource is controlled in real-time so that the winning bidder has access to the resource he has won as soon as bidding closes.

6. The method of claim 1, wherein the bid is received from a software agent.

7. The method of claim 6, wherein the software agent bids in accordance with a strategy rule.

8. The method of claim 7, wherein the strategy rule is a truthful best reply strategy.

9. The method of claim 6, wherein the software agent bids in accordance with a valuation rule.

10. The method of claim 9, wherein the valuation rule is determined in accordance with at least one measured network parameter.

11. The method of claim 6, wherein the software agent bids in accordance with an allocation rule.

12. The method of claim 1, wherein deciding which bid has won the bidding is performed in accordance with an allocation rule.

5           13. The method of claim 12, wherein deciding which bid has won the bidding is performed in accordance with a market allocation rule also used by a buyer software agent, the market allocation rule defining the rules of the resource market.

10           14. The method of claim 12, wherein deciding which bid has won the bidding is performed in accordance with an English Auction market allocation rule.

15           15. The method of claim 12, wherein deciding which bid has won the bidding is performed in accordance with a continuous bid-ask trading market allocation rule.

16           16. The method of claim 12, where deciding which bid has won the bidding is performed in accordance with a progressive second price auction allocation rule.

20           17. The method of claim 12, where deciding which bid has won the bidding is performed in accordance with a hold option allocation rule.

            18. The method of claim 1, further comprising:  
                storing information concerning which bid has won, for accounting purposes.

25           19. The method of claim 1, wherein there are several resources, and a respective resource agent performs the elements of claim A for each resource.

            20. The method of claim 1, wherein there is one resource, and a single resource agent performs the elements of claim 1 for the resource.

30           21. The method of claim 1, wherein the elements of claim 1 are performed by a resource agent executing on a separate computer than the placing the bids.

22. The method of claim 1, wherein the elements of claim 1 are performed by a resource agent executing on the same computer as at least one placing at least one of the bids.

23. The method of claim 1, wherein the is controlled by a human being, who decides how to bid.

24. The method of claim 1, further comprising:  
deciding, by a bidder agent, how to bid based on a valuation function of the bidder agent and a strategy algorithm of the .

25. The method of claim 1, further comprising: receiving an offer to sell resources from a seller agent.

26. The method of claim 1, further comprising:  
receiving player agents in a garage of a resource agent and receiving bids from player agents in the garage.

27. The method of claim 1, wherein the bid is received from a player agent that also submits offers to sell resources.

28. The method of claim 1, further comprising:  
before bidding, receiving a request from a buyer software agent for a location of resource agent.

29. The method of claim 1, further comprising:  
sending at least one bid in real-time for a resource;  
receiving a notification that the sent bid has won the bidding;  
selling the use of the winning resource to third parties through a separate resource agent; and

notifying a resource management and control agent that the third parties will be using the resource.

30. A method, performed by a multiagent, comprising:

5 sending at least one bid in real-time for a resource in accordance with a strategy rule and a valuation rule of the multiagent and in accordance with a system-wide allocation rule;

receiving a notification that the sent bid has won the bidding;

10 selling the use of the winning resource to third parties through a separate resource agent; and

notifying a resource management and control agent that the third parties will be using the resource.

15 31. A method, performed by a buyer agent, comprising:

20 sending at least one bid in real-time for a resource in accordance with a strategy rule and a valuation rule of the buyer agent and in accordance with a system-wide allocation rule;

receiving a notification that the sent bid has won the bidding; and

making use of the resource in real time, immediately after winning the bid.

32. The method of claim 32, wherein the system wide-allocation rule is a PSP allocation rule.

33. A system for real-time market-based resource allocation, comprising:

25 means for receiving at least one bid in real-time for a resource;

means for deciding which of the at least one bids has won the bidding; and

means for controlling the resource so that it is committed to the winning bidder.

34. A system for real-time market-based resource bidding by a multiagent, comprising:

means for sending at least one bid in real-time for a resource in accordance with a strategy rule and a valuation rule of the multiagent and in accordance with a system-wide allocation rule;

means for receiving a notification that the sent bid has won the bidding;

5 means for selling the use of the winning resource to third parties through a separate resource agent; and

means for notifying a resource management and control agent that the third parties will be using the resource.

10 35. A system for real-time market-based resource bidding by a buyer agent, comprising:

means for sending at least one bid in real-time for a resource in accordance with a strategy rule and a valuation rule of the buyer agent and in accordance with a system-wide allocation rule;

means for receiving a notification that the sent bid has won the bidding; and

15 means for making use of the resource in real time, immediately after winning the bid.

36. The system of claim 35, wherein the system wide-allocation rule is a PSP allocation rule.

20 37. A system for real-time market-based resource allocation, comprising:

a portion configured to receive at least one bid in real-time for a resource;

a portion configured to decide which of the at least one bids has won the bidding;

and

25 a portion configured to control the resource so that it is committed to the winning bidder.

38. A system for real-time market-based resource bidding by a multiagent, comprising:

30 a portion configured to send at least one bid in real-time for a resource in accordance with a strategy rule and a valuation rule of the multiagent and in accordance with a system-wide allocation rule;

a portion configured to receive a notification that the sent bid has won the bidding;

a portion configured to sell the use of the winning resource to third parties through a separate resource agent; and

5 a portion configured to notify a resource management and control agent that the third parties will be using the resource.

39. A system for real-time market-based resource bidding by a buyer agent, comprising:

10 a portion configured to send at least one bid in real-time for a resource in accordance with a strategy rule and a valuation rule of the buyer agent and in accordance with a system-wide allocation rule;

a portion configured to receive a notification that the sent bid has won the bidding; and

15 a portion configured to make use of the resource in real time, immediately after winning the bid.

40. The system of claim 39, wherein the system wide-allocation rule is a PSP allocation rule.

20 41. A computer program product, including instructions for causing a data processing device to perform actions for real-time market-based resource allocation, comprising:

receiving at least one bid in real-time for a resource;

deciding which of the at least one bids has won the bidding; and

controlling the resource so that it is committed to the winning bidder.

25 42. A computer program product, including instructions for causing a multiagent of a data processing device to perform actions for real-time market-based resource bidding, comprising:

30 sending at least one bid in real-time for a resource in accordance with a strategy rule and a valuation rule of the multiagent and in accordance with a system-wide allocation rule;

receiving a notification that the sent bid has won the bidding;  
selling the use of the winning resource to third parties through a separate resource  
agent; and

notifying a resource management and control agent that the third parties will be  
5 using the resource.

43. A computer program product, including instructions for causing a buyer agent of a  
data processing device to perform action for real-time market-based resource bidding,  
comprising:

10 sending at least one bid in real-time for a resource in accordance with a strategy  
rule and a valuation rule of the buyer agent and in accordance with a system-wide allocation rule;  
receiving a notification that the sent bid has won the bidding; and  
making use of the resource in real time, immediately after winning the bid.

15 44. The computer program product of claim 43, wherein the system wide-allocation rule  
is a PSP allocation rule.